2nd Grade - Lesson 1.3
Designing an Absorbency Test
Teacher Background

In Lesson 1.3, students conduct an absorbency test. Like the tests in Lesson 1.2, an important concept for students is that in a fair test, all materials tested are treated in the same way. Students see that felt and paper absorb water, but the plastic and aluminum foil do not.

Absorption on the Molecular Level

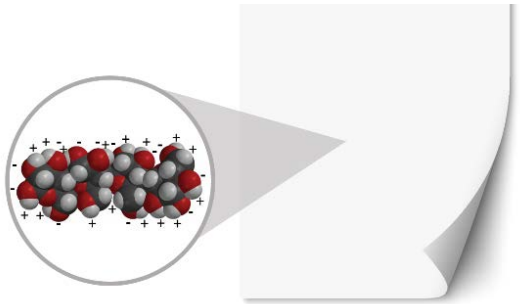
In the EXPLAIN section of the lesson, you can tell students that water molecules are attracted to felt and paper more than they are to plastic and aluminum. Also, the felt and paper have tiny spaces for the water molecules to enter and move through, but aluminum and plastic do not have these spaces.

This may be the first time that students have been introduced to the term "molecule." For second graders, a familiarity with the term and a general idea of the meaning is enough. You can tell students that everything in the world is made of extremely tiny particles called atoms and that atoms join together to make molecules. You can tell them that atoms and molecules are so small that we can't see them, even with a microscope.

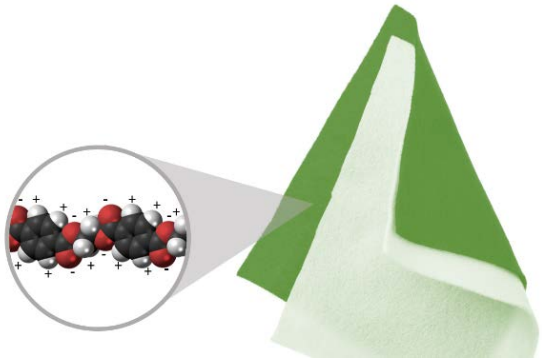
Sometimes You Can Generalize

Like the tests in the previous lesson, the absorbency test is conducted on samples of plastic, paper, aluminum foil, and also felt. Unlike the tests in Lesson 1.2, the results of the absorbency test *can* be generalized as a characteristic property of the materials and not just the particular samples being tested. In general, paper and felt are made of molecules that attract water molecules, but aluminum and other metals and wax are made from atoms or molecules that do not attract water molecules.

A more detailed explanation, not for second graders, is that water molecules have areas of positive and negative charge. The cellulose that makes up the paper and the polyester fibers in the felt are composed of molecules that also have areas of positive and negative charge. Since opposites attract, the water molecules are attracted to the felt and to the paper and are absorbed by them. Water molecules are also attracted to each other so they tend to move into the tiny spaces as the water continues to be attracted to the material.

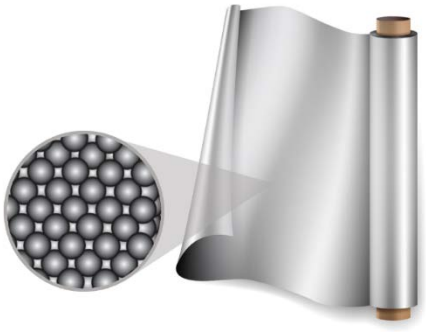


Cellulose Molecule

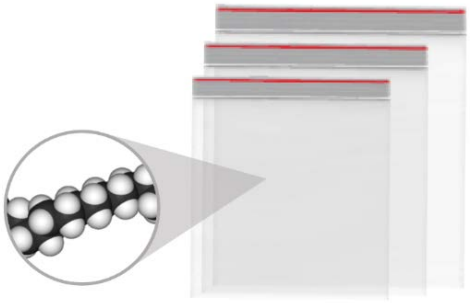


Polyester Molecule

The aluminum atoms and the molecules that make up the plastic do not have these areas of positive and negative charge so water molecules are not attracted to them and are not absorbed by them. These materials also do not have tiny spaces for the water to move through.



Aluminum Atoms



Polyethylene Molecule